No. 8194

JVC Service Manual

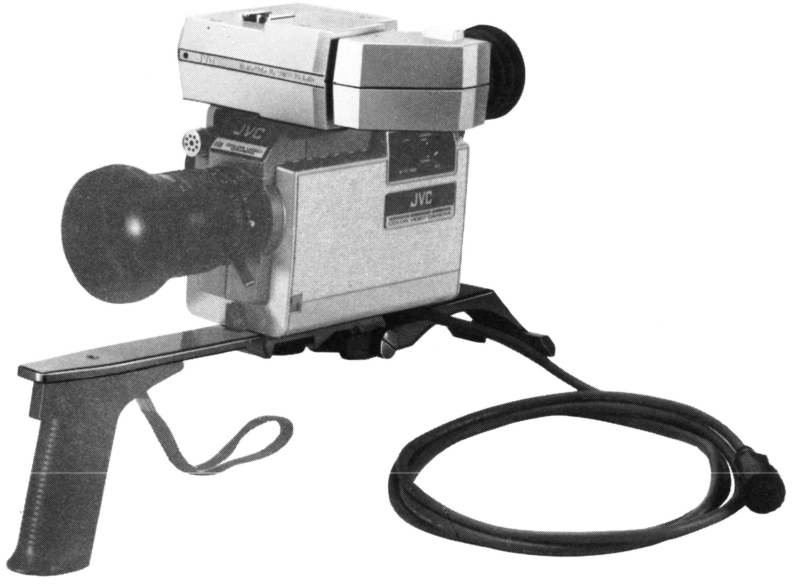
ELECTRONIC VIEWFINDER

MODEL VF-P30E

VICTOR COMPANY OF JAPAN, LIMITED

No. 8194

JVC Service Manual



MODEL **VF-P30E**

VICTOR COMPANY OF JAPAN, LIMITED

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SECTION 1
GENERAL DESCRIPTION

This manual provides service information for the JVC Model VF-P30E.
For convenience, the text of the Instructions is reproduced on the following pages. Numbering of the pages also corresponds to the Instructions. However, the Instructions used by the customers are in English, French and German versions. The following is a reprint of only the English version.

Thank you for purchasing the VF-P30E electronic viewfinder. This unit is specially designed for exclusive use with JVC GX-33E and GX-66E colour video cameras. It not only enables monitoring the scenes being shot, but also monitoring the playback picture from the connected video recorder. Employing the electronic viewfinder together with the provided shoulder rest will give you a more "professional feel" of camera operation.

To take best advantage of and gain the most service from your VF-P30E, read this instruction booklet carefully and thoroughly.

CAUTION:
To prevent electric shock, do not open the cabinet. No user serviceable parts inside. Refer servicing to qualified service personnel.

Note:
The rating plate (Serial Number Plate) is on the bottom of the unit.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

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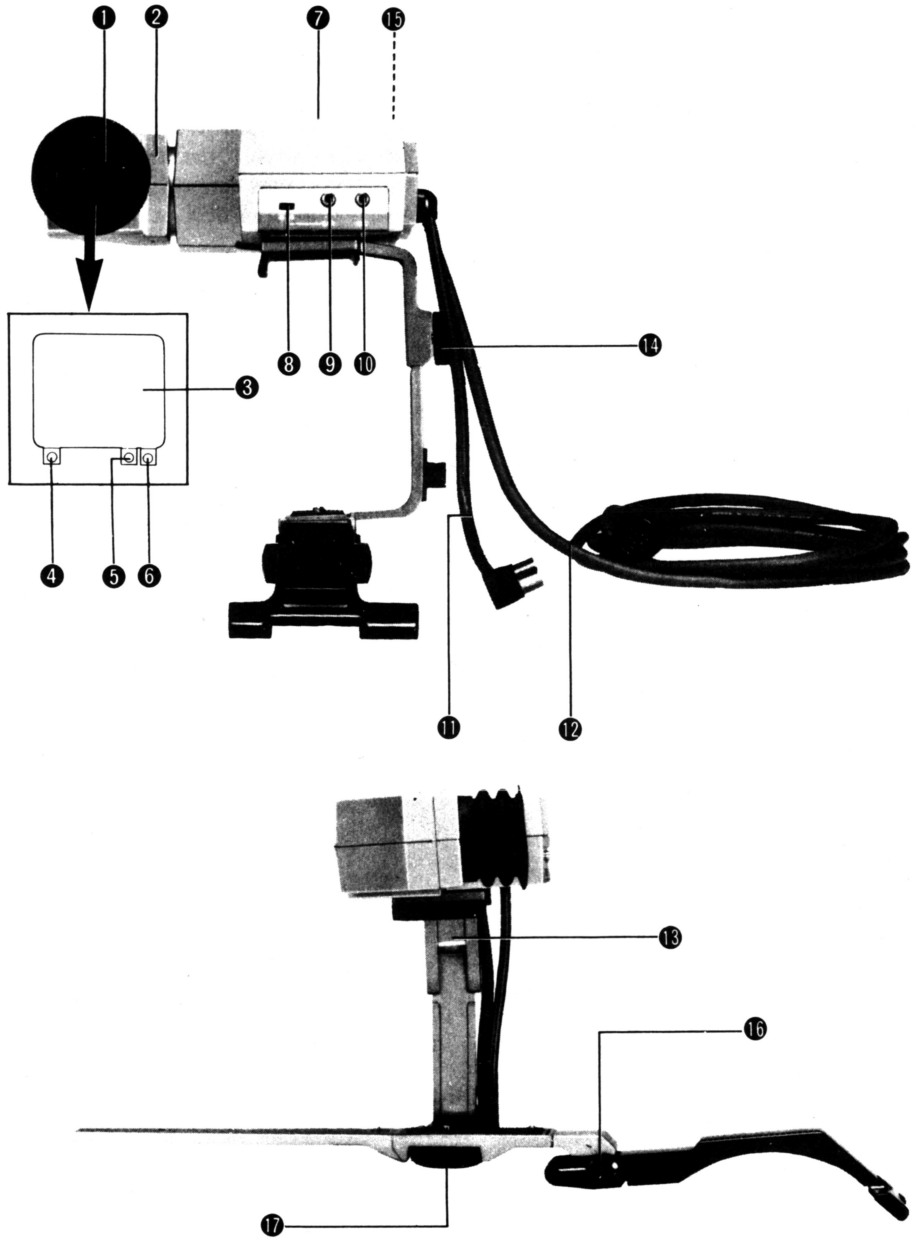
PRECAUTIONS

- This electronic viewfinder is for exclusive use with the JVC GX-33E/66E video cameras. It cannot be used with any other camera.
- Prevent inflammables, water and metallic objects from entering the VF-P30E.
- Do not remodel or disassemble the unit.
- Do not subject the unit to shocks. Exercise special care while carrying it.
- Avoid using the unit under the following conditions:
  - Extremely hot or cold places
  - Places subject to excessive humidity
  - Places subject to excessive vibrations

FEATURES

- May be connected to the JVC colour video cameras GX-33E and GX-66E.
- Low power consumption design with 1.5" (38 mm) CRT, consuming only 2.4 watts including tally lamp.
- External microphone and earphone jacks provided.
- Accessory shoe to accept an external microphone or lighting device.
- Shoulder rest for steady operation that gives a professional camera "feel".
- The eyepiece can be tilted as much as 90° upward and 20° downward and the body can be turned up to 90° for assuring easy viewability for most any shooting angle.
- Under-exposure, recording/tape running and battery power warning are all indicated in the viewfinder.
- Tally lamp provided.

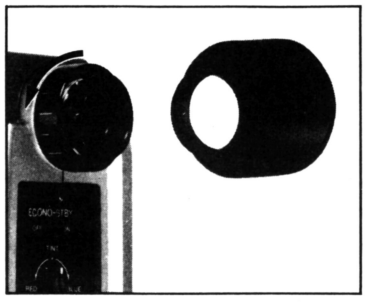
CONTROLS AND CONNECTORS



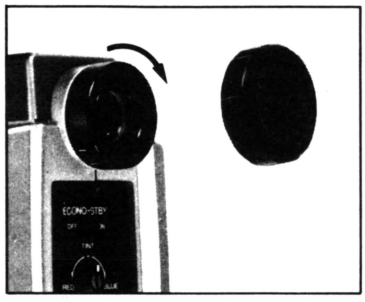
1. **Eye cup**
2. **Eyepiece**
   The eyepiece can be flipped up for easy viewability for indoor use.
3. **Viewfinder screen**
   Black/white pictures are displayed on this 1.5" (38 mm) CRT screen.
4. **Battery warning indicator**
   Lights red when the power of the battery pack (installed in the recorder) becomes insufficient during recording or playback.
5. **Under-exposure indicator**
   Lights red for under-exposure.
6. **Tape running indicator**
   Lights green when the tape is stationary and flickers green while the tape is running.
7. **Accessory shoe**
   For mounting an external microphone (optional) or a lighting device.
8. **Earphone circuit select switch**
   Set to "■" when employing this unit in combination with the HR-2200 recorder.
   Set to "□" when employing this unit in combination with video recorders other than the HR-2200.
   (See page 10.)
9. **Earphone jack (EAR)**
   Connect an earphone to monitor the sound.
10. **External microphone jack (MIC)**
    Connect an external microphone such as a uni-directional microphone to this jack. Plugging in an external microphone automatically switches off the camera's built-in microphone.
11. **Viewfinder cable**
    Connect to the terminal on the bottom of the camera body.
12. **Camera cable**
    Connect to the CAMERA connector of a VTR.
13. **Bracket**
    For installing the viewfinder onto the camera body.
14. **Retaining screw ring**
15. **Tally lamp**
    Lights red while the camera is in operation for recording.
16. **Shoulder rest positioning screws.**
17. **Camera retaining screw**

SETUP PROCEDURE

INSTALLING THE VF-P30E ON THE CAMERA

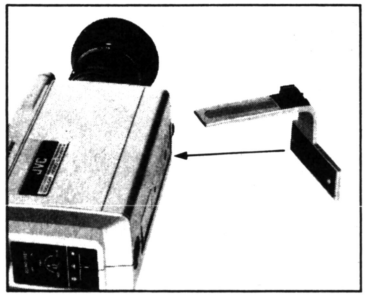


1. Remove the eye cup from the camera by first turning the diopter control ring fully counterclockwise so that the eyepiece lens comes outward.

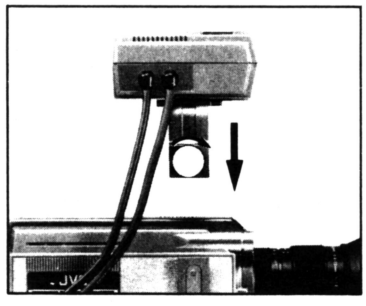


2. Turn the diopter control ring fully clockwise so that the eyepiece lens retracts and place the cap on the optical viewfinder.

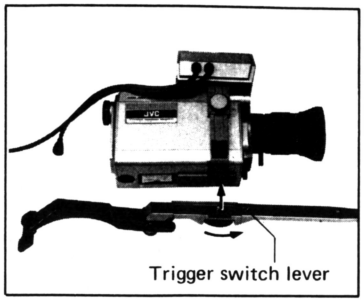
   Note:
   Shooting without the cap on the optical viewfinder may result in some reflections in the picture because of light entering through the optical viewfinder.



3. Position the viewfinder mounting bracket under the camera body so that the bracket's screw hole is aligned to the camera's handgrip mounting hole.

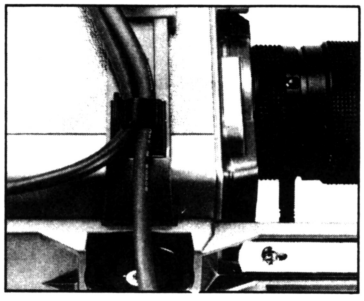


4. Slide the viewfinder's bracket onto the attached viewfinder mounting bracket until the viewfinder rests on top of the camera body and tighten the bracket retaining screw.

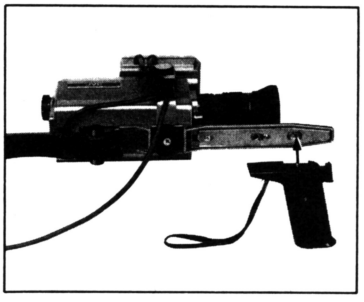


5. Insert the retaining screw of the shoulder rest into the screw hole and turn the retaining screw ring to secure the bracket and shoulder rest firmly to the camera body.

Note:
Before turning the retaining screw ring, make sure that the trigger switch lever on the frame of the shoulder rest engages into the slot of the camera's trigger switch.

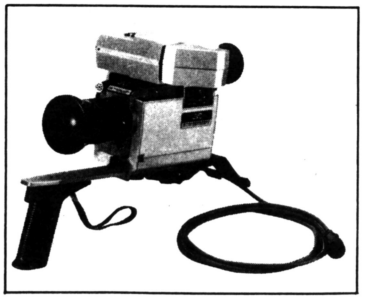


6. Position the two cables into the cable clamp, and connect the viewfinder cable to the connector on the bottom of the camera body.



7. Attach the handgrip to the extended portion of the shoulder rest by screwing the retaining screw into the provided hole.

8. Adjust the position of the shoulder rest to fit the physical contour of the operator's shoulder by loosening the two screws and moving the shoulder rest back and forth, then re-tightening the screws.



RETAINING ATTACHMENT

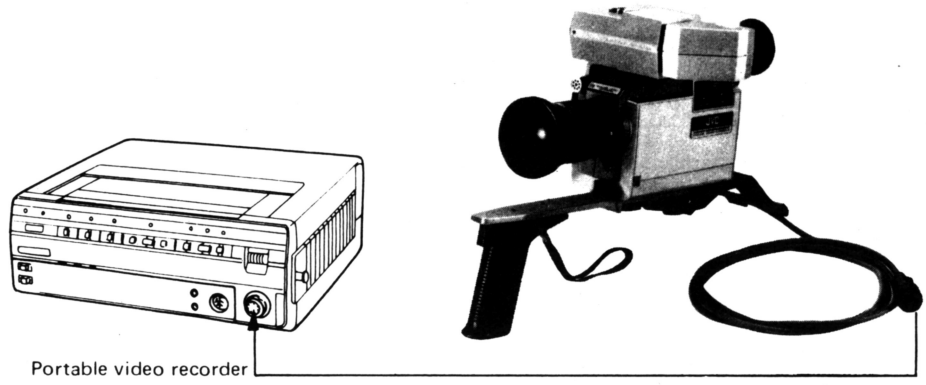
Employ the retaining attachment provided when mounting the camera onto a tripod while leaving the electronic viewfinder connected to the camera.

Mounting procedure:

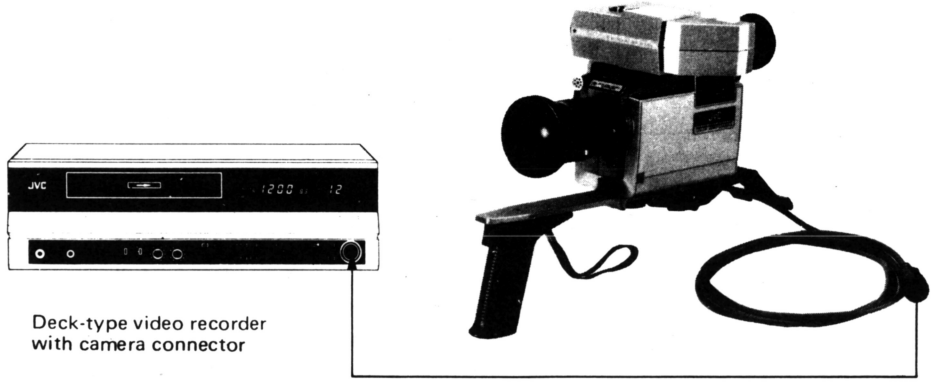
1. Remove the shoulder frame from the camera and replace it with the attachment.
2. Mount the camera onto a tripod using the hole provided on the bottom of the attachment.

CONNECTING TO A VIDEO RECORDER

- Connect the camera cable to the 10-pin CAMERA connector of a video cassette recorder such as the JVC HR-2200EG/EK portable recorder or a deck-type recorder. (The HR-2200EG/EK is referred to as the HR-2200 in the following.)



Portable video recorder

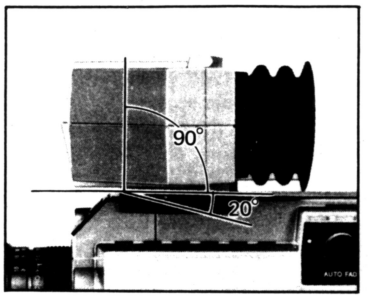


Deck-type video recorder
with camera connector

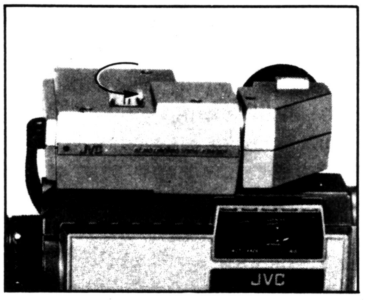
Notes:

- The position of the CAMERA connector on your recorder may differ from that shown here.
- When using the VF-P30E, the camera cable supplied with your camera is not needed.
- If you need more distance between the camera and the recorder, employ a camera extension cable (VC-234-10U, optional). This 10-m cable can be connected between the camera cable and the recorder.
- When connected to a video recorder other than the HR-2200, some functions of the VF-P30E may not operate normally. This is not due to any defect of the VF-P30E.

ADJUSTING THE VIEWFINDER POSITION



- Tilt the viewfinder eyepiece to the desired angle depending on the camera angle and your handling posture; it can be tilted upward by 90° and downward by 20°.

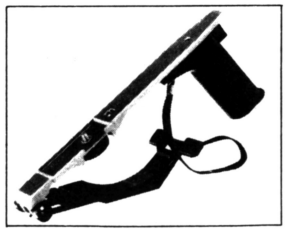


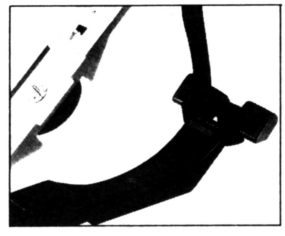
- The viewfinder body can be turned up to 90°. This position will not only be helpful for flexible camera work, but also for space-saving storage.

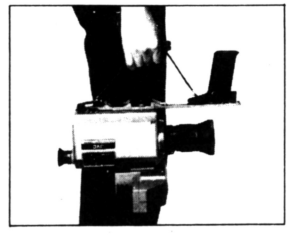
Using the shoulder rest as a carrying handle

When carrying the camera, already equipped with the electronic viewfinder, the shoulder rest can function as a carrying handle. For this purpose, loosen the lock screws on the shoulder rest and fold it as shown. Then insert the wrist strap into the slot at the end of the shoulder rest and tie it as shown.

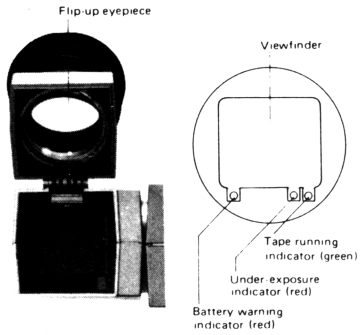
Note: Do not use the shoulder rest on its own to carry the camera. Be sure to follow these instructions.







OPERATION



Monitoring the scenes being shot

- Images will appear on the viewfinder about 10 seconds after the recorder power has been switched on.
- Start shooting after the images have become stabilized.
- Adjust the focus, exposure and composition while referring to the image on the viewfinder screen.
- Depending on the camera angle, directly looking at the viewfinder screen with the eyepiece flipped up will facilitate adjustment.

Monitoring the playback picture

- If you wish to view the recordings on the spot, simply rewind the tape and engage the Play mode on the recorder. Then the playback picture will appear on the viewfinder screen.
- Flip up the eyepiece for easy viewing.

Viewfinder indicators

Indication differs depending on the video recorder connected.

Battery warning indicator

- This indicator functions only when the JVC HR-2200 recorder is used.
- It lights red when the power of the battery pack installed in the HR-2200 becomes insufficient.
- When this indicator lights, put the recorder in the Stop mode and replace the battery pack.
- If you continue shooting with this indicator lighting, normal pictures may not be obtained.

> **Notes:**
> - The battery warning indicator flashes for about 2 seconds regardless of the battery pack condition when the HR-2200 is switched on.
> - When you are using a camera adapter such as the GA-22E/23E, the battery warning indicator may light. This does not mean any trouble. There is no problem in operation.

When using a portable recorder other than the HR-2200

- Since the battery warning indicator does not function, refer to the picture condition on the viewfinder screen for determining insufficient battery power.
- If the picture on the viewfinder screen starts vibrating or rolling, the battery power may be insufficient.
- Your portable recorder may have a battery warning indicator. Refer to it and replace the battery pack at suitable times.

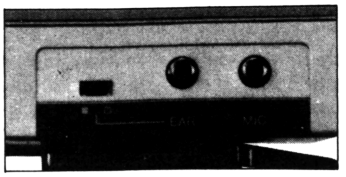
Under-exposure indicator

- Optimum exposure may be obtained while this indicator is off.
- When this indicator lights, the amount of light is insufficient, providing underexposed pictures. Apply additional lighting.

Tape running indicator

- This indicator functions only when the JVC HR-2200 recorder is used.
  Remains lighted: in the Pause and Stop modes.
  Flickers: when the tape is running.

> **Note:**
> When a video recorder other than the HR-2200 is used, the tape running indicator lights regardless of the operational mode. Therefore, checking the tape running condition cannot be performed.



Monitoring the sound

If you are using the HR-2200 recorder, set the earphone circuit select switch to "■". This will enable the microphone input to be monitored during recording or the playback sound to be heard during playback monitoring.

If you are using any video recorder other than the HR-2200, set the earphone circuit select switch to "□". This will enable the microphone input to be monitored during recording.

Notes:

- If an earphone is connected to the recorder, no output is available from the EAR jack.
- Use a small screwdriver or the like for resetting the earphone circuit select switch.
- If the earphone circuit select switch is set to a wrong position, no audio may be heard or some noise may be mixed.
- If you need a camera extension cable, employ the VC-234-10U. With the VC-233-10U, playback sound cannot be monitored during playback monitoring of the recording.

Recording with an external microphone

If you install an external microphone in the accessory shoe on the electronic viewfinder, employ an electret-type microphone.

Note:

- If you employ a magnetic-type microphone, it should be installed in a way which keeps it about 60 or 70 mm away from the electronic viewfinder.

SPECIFICATIONS

Picture tube	: 38 mm (1.5")
Scanning system	: PAL-type signal, 625 lines, 2:1 interlaced
Power consumption	: 2.2 watts (without tally), 2.4 watts (with tally)
Horizontal resolution	: More than 350 lines (at center)
Microphone jack	: 3.5 mm dia. Input sensitivity -66 dB Input impedance 10 kohms
Earphone jack	: 3.5 mm dia. Output level 0 dB Output impedance 8 ohms – 2.2 kohms
Dimensions	: Viewfinder: 115(H) x 186(W) x 110(D) mm without shoulder frame
Weight	: Viewfinder: 750 g Shoulder rest: 300 g
Accessories	: Cap for optical viewfinder
Accessories	Mounting bracket Retaining attachment

Design and specifications subject to change without notice.

SECTION 2
DISASSEMBLY

2.1 TAKING OUT THE PRINTED CIRCUIT BOARDS

1. Remove the 3 screws ① from the top case. (See Fig. 2-1)
   Remove the 2 screws ② from the top and bottom mirror case. (See Fig. 2-1 and Fig. 2-2)
   Remove the whole assembly of the VF cover and the top and bottom mirror case.

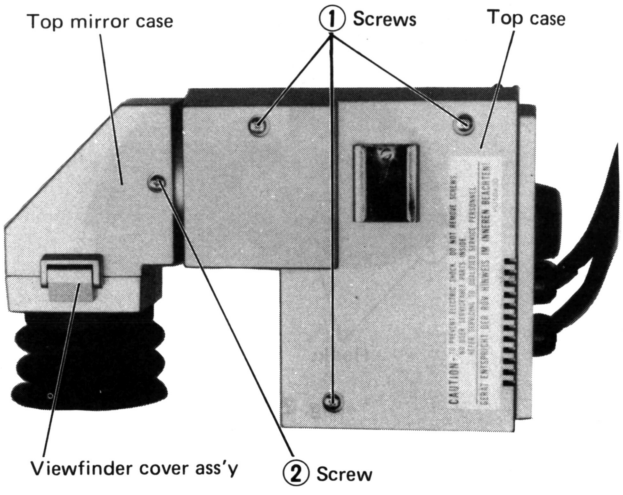


Fig. 2-1

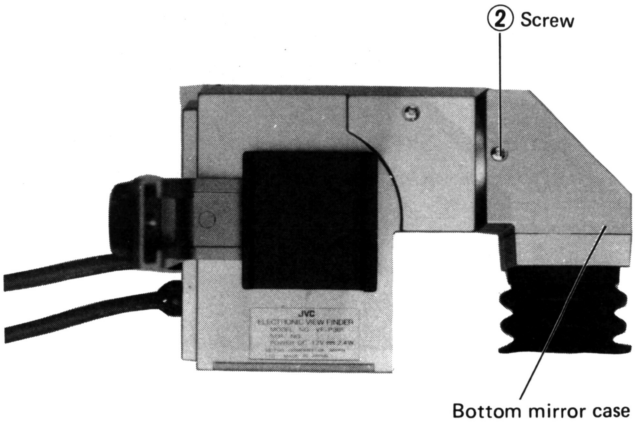


Fig. 2-2

2. Remove the top case and remove each of the screws ③ holding the 2 brackets (A). Refer to Fig. 2-3.

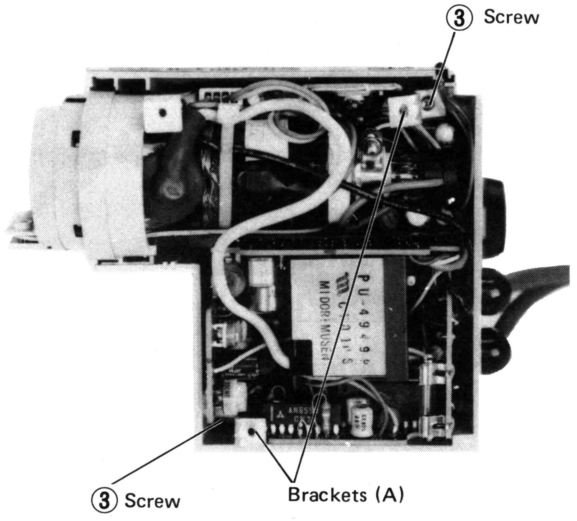


Fig. 2-3

3. Using radio plyers, remove the 2 strain reliefs which fix the cables firmly. Refer to Fig. 2-4.
   Lift out the assembly of the CRT and VF holder from the bottom case.

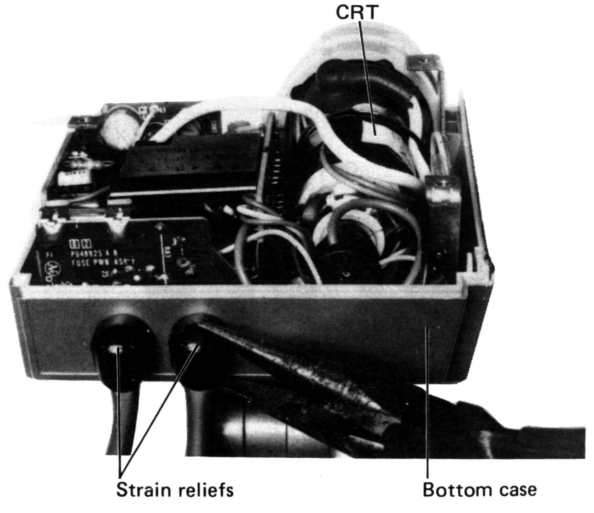


Fig. 2-4

4. As shown in Fig. 2-5, lift up the main board and take out the entire main board in the opposite direction from the earphone and microphone terminals. Be sure that you do not pull the transistor X1 heat sink off.

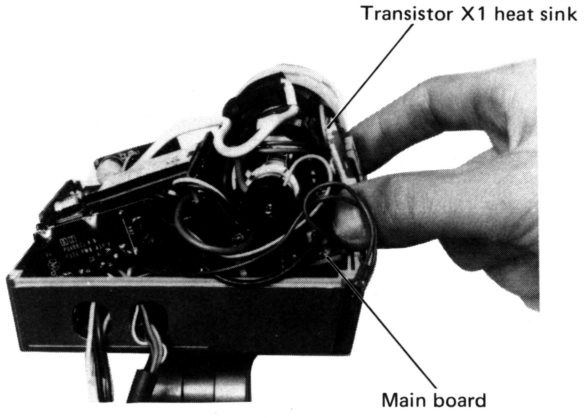


Fig. 2-5

2.2 CRT REPLACEMENT

1. Loosen the 2 screws ④ of the CRT clamp and remove the VF holder from the CRT (Refer to Fig. 2-6).
2. Remove the anode cape and then remove the CRT socket. Remove connector P1.
3. Loosen the screw ⑤ holding the CRT yoke and remove the CRT yoke from the CRT. Remove according to the abovementioned procedures and mounting is to be done in reverse order.

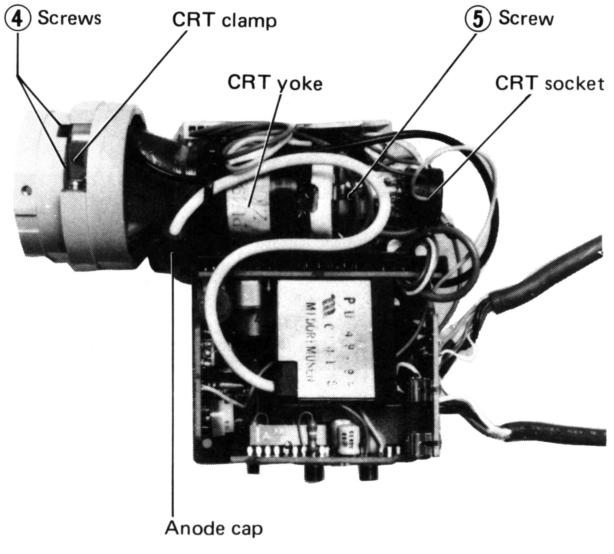


Fig. 2-6

2.3 MIRROR REPLACEMENT

1. Remove the top mirror case from the bottom mirror case.
   Please note the hooks on the top mirror case, as shown in Fig. 2-7. Remove the mirror case carefully to avoid breaking these hooks.

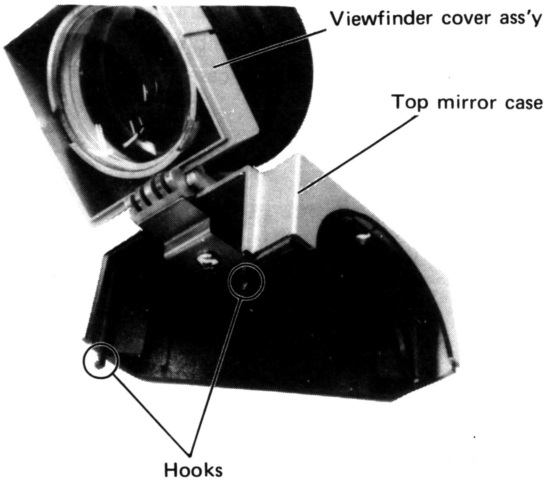


Fig. 2-7

2. The mirror has a front and back. If you affix the back side, a double image will appear so be sure to correctly affix the front side.

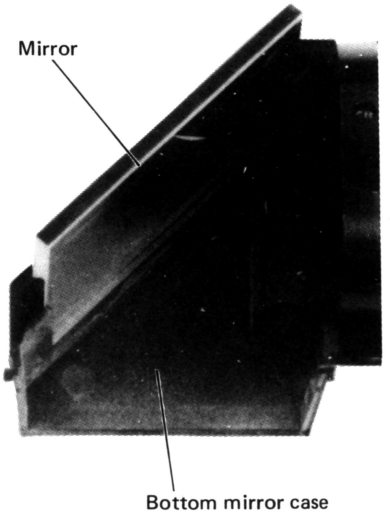


Fig. 2-8

SECTION 3
ELECTRONIC ADJUSTMENTS

3.1 PREPARATIONS

1. Use the camera adapter GA-23E, or supply 12V of regulated DC power supply to the pin 10 (plus side) and the pin 9 (GND side) of the camera connector plug.
2. The video signal supplies a monoscope or stairstep at a level of 2Vp-p (Do not terminate at 75Ω).
   As shown in Fig. 3-1, the video signal is supplied from the GA-23E VIDEO OUT terminal.
3. For various confirmation, prepare a color camera GX-33E or GX-66E and a portable video cassette recorder HR-2200E.

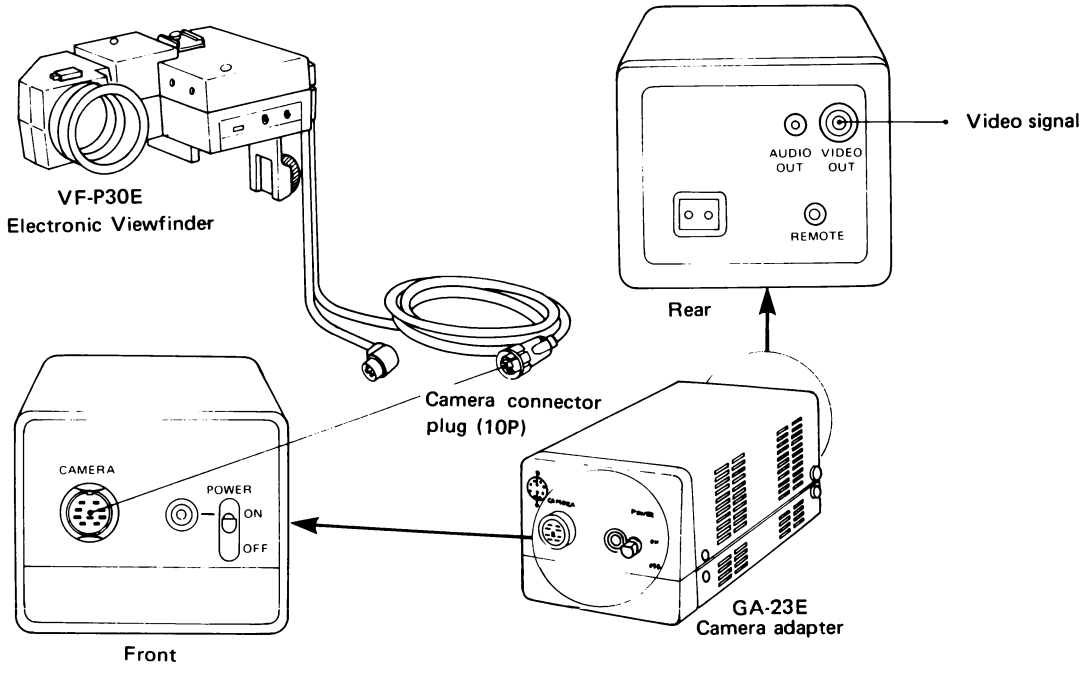


Fig. 3-1

3.2 ADJUSTMENT

1. Brightness
   Set the video input signal to OFF and adjust R16 (BRIGHT) on the video board so that the CRT luster is only slightly visible.
2. Contrast
   Supply the stairstep signal and adjust R5 (CONTRAST) on the video board so that it has optimum gradation.
3. Focus
   Supply the monoscope signal, and looking at the signal wedge, adjust R54 (FOCUS) on the high voltage board to obtain the best resolution.
4. Horizontal Hold
   With no signals, connect an oscilloscope to the connector P1-1 on the main board. Adjust R43 (H. HOLD) on the main board until the wave cycle reaches 64.0±1.5μsec. See Fig. 3-2.

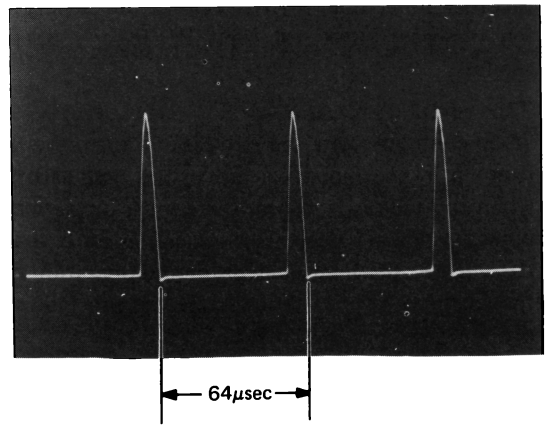


Fig. 3-2

5. Vertical Hold
With no signal, connect an oscilloscope to the P1-4 on the main board. Adjust R40 (V. HOLD) until the wave cycle reaches 24.0 $^{+1.5}_{-1.0}$ msec. See Fig. 3-3.

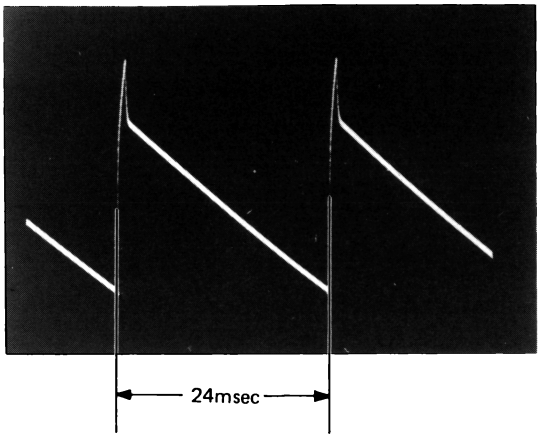


Fig. 3-3

6. Vertical Height and Vertical Linearity
Supply the monoscope signal and adjust R24 (V. LIN) and R21 (V. HEIGHT) on the main board until the circle becomes round.

7. Centering
Supply the monoscope signal and adjust the centering magnet of the deflecting yoke so that the four corners of the picture are uniform from right to left, up and down.

8. Battery Warning Indicator
When combined with the HR-2200E, make sure that the battery warning indicator on this machine lights up at the same time the HR-2200E battery warning indicator lights up. Combining with a portable video recorder other than the HR-2200E, the battery warning indicator does not light up in any operation mode.

9. Tape running Indicator
When combined with the HR-2200E, when the tape is running in the recording mode, the light is off and when the tape is in pause, the light is on. Combining with a protable video cassette recorder other than the HR-2200E, the light goes on in any operation mode. In the playback mode, make sure that this indicator is off.

10. Under Exposure Indicator
1) With no signals, adjust R68 (EE SET) on the main board so that the center of R68 becomes between 0.63 and 0.66 volts DC. In this condition, confirm that the indicator lamp is lighting.
2) When the monoscope signal is supplied, confirm that the indicator lamp turns off.

11. Tally Lamp
Make sure that the tally lamp operates in the same way as the recording mode indicator. Refer to item 9.

12. Microphone and Earphone

1) MIC
Supply a −76dB and a 1 KHz signal to J2 of the main board and confirm that terminal 17 has a −20dB output power.

2) EAR
With the same conditions of 1) above, make sure that pin 4 at J1 is 0dB in 1KHz (without a load, 2.2 Vp-p). Set S1 of the main board on the side marked "□".

13. Earphone Select Switch
When S1 of the main board is set on the side marked "□", make sure that noise of the external microphone and camera microphone can be monitored, and when it is switched to the side marked "■", make sure that the voice of HR-2200E can be monitored.

14. Recording Switch
Confirm that the running of HR-2200E tape can be controlled by the GX-33E/66E recording switch at the time of recording only.

SECTION 4
CHARTS AND DIAGRAMS

4.1 KEY TO ABBREVIATIONS

AFC	:	Automatic Frequency Control
AGC	:	Automatic Gain Control
AMP	:	Amplifier
BPF	:	Band-Pass Filter
C.D.	:	Count Down
COMP BLK	:	Composite Blanking
CONN.	:	Connector
CONV.	:	Converter
CRT	:	Cathode Ray Tube
CTL	:	Control
DEF.		Deflection
DET.		Detector
EAR		Earphone
EF		Emitter Follower
E.SW		Electronic Switch
GEN		Generator
H. HOLD	:	Horizontal Hold
HPF	:	High-Pass Filter
H.P. SHAPE	:	Horizontal Pulse Shaper
H.V.	:	High Voltage
INV		Inverter
K	:	Cathode
LIN		Linearity
LPF		Low-Pass Filter
MIC	:	Microphone
MM	:	Monostable Multivibrator
OSC	:	Oscillator
P.B.	:	Playback
P. DET.	:	Phase Detector
P. TR.	:	Power Transistor
REF VOLT	:	Reference Voltage
REG.	:	Regulator
SF	:	Source Follower
SW	:	Switch
SYNC SEP	:	Sync Separator
TR	:	Transistor
VF	:	Viewfinder
V. HOLD	:	Vertical Hold
V. LIN	:	Vertical Linearity
VR	:	Variable Resistor

4.2 MAIN PARTS LOCATIONS

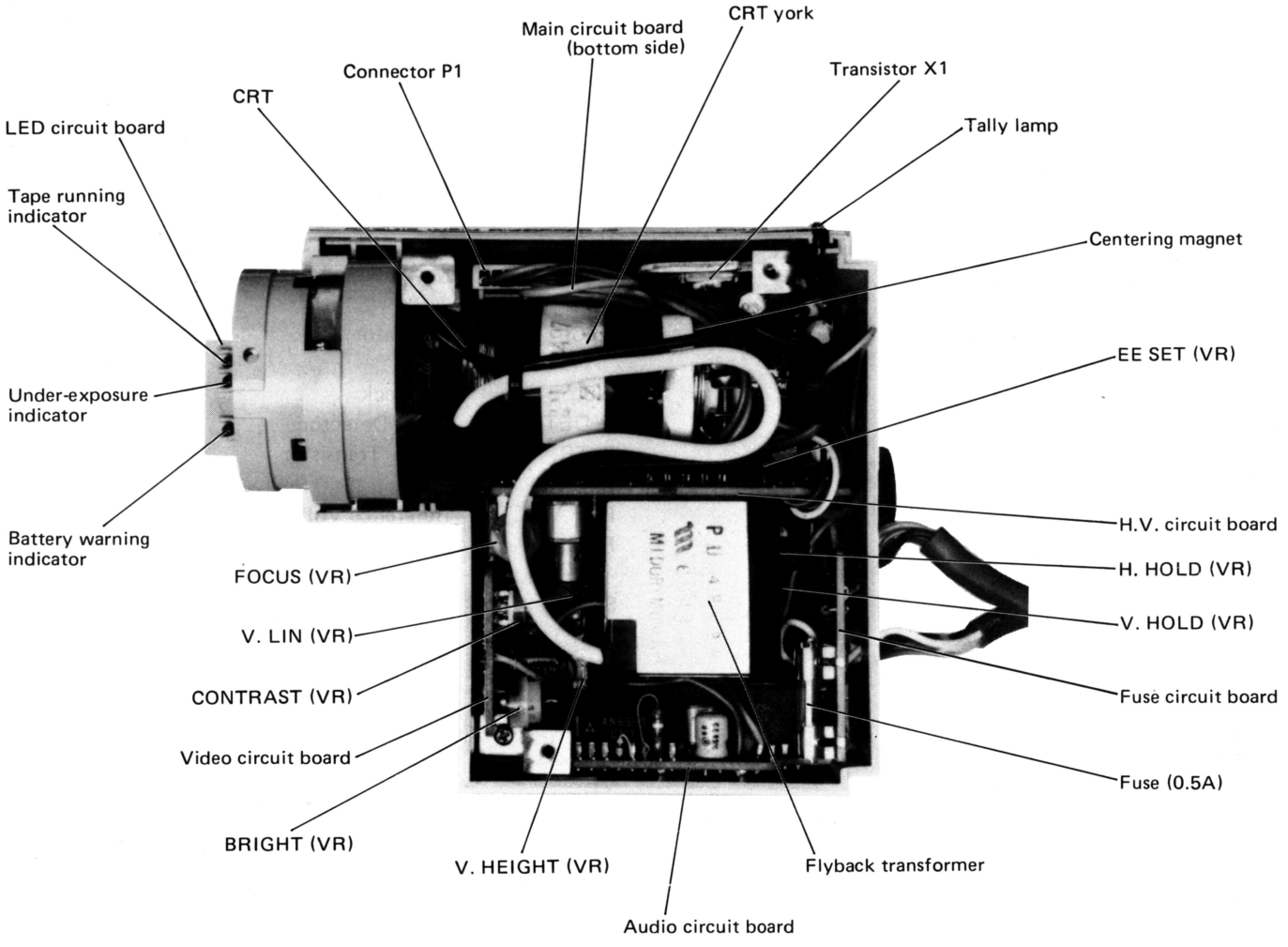
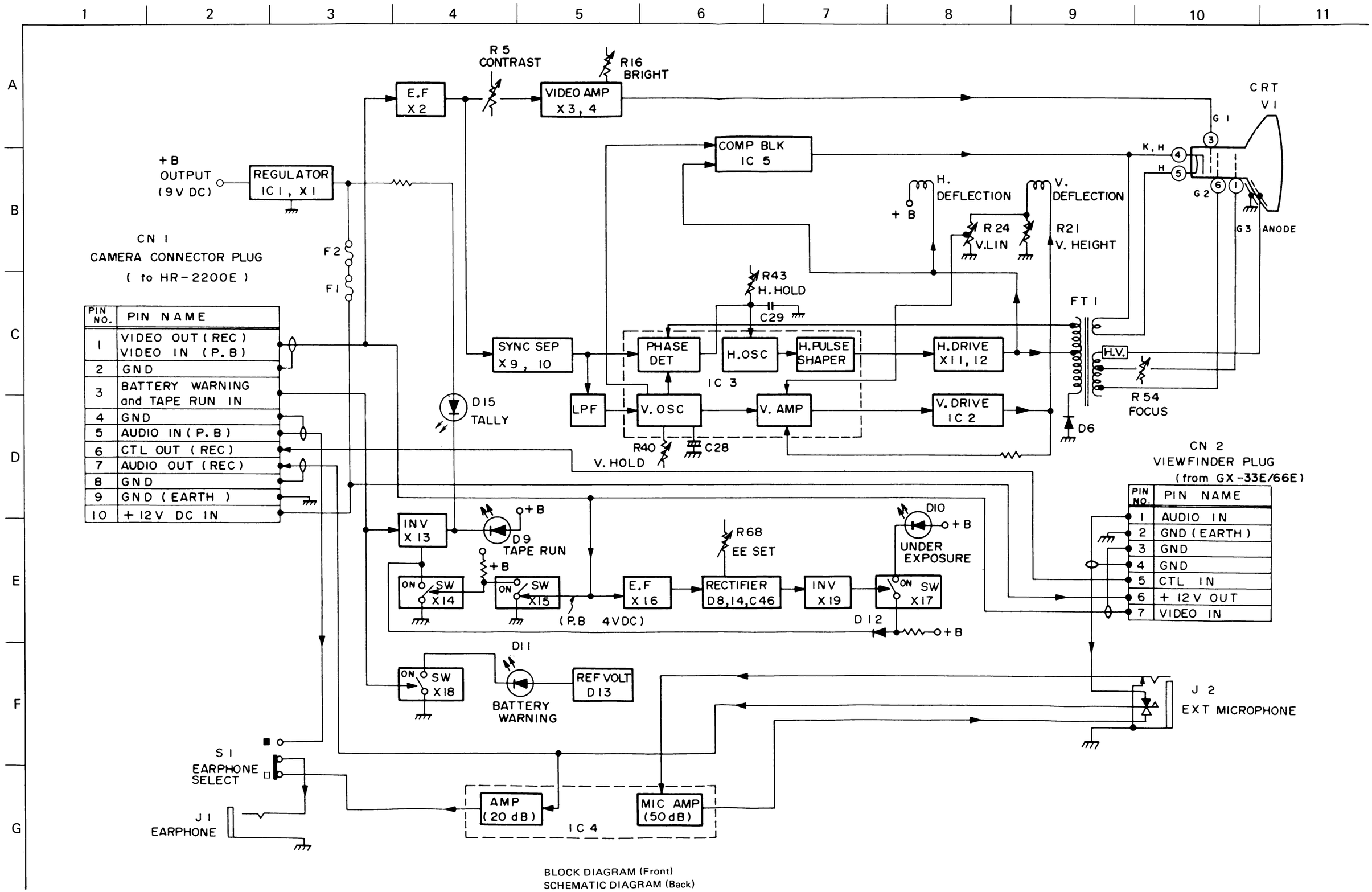


Fig. 4-1

4.3 BLOCK DIAGRAM



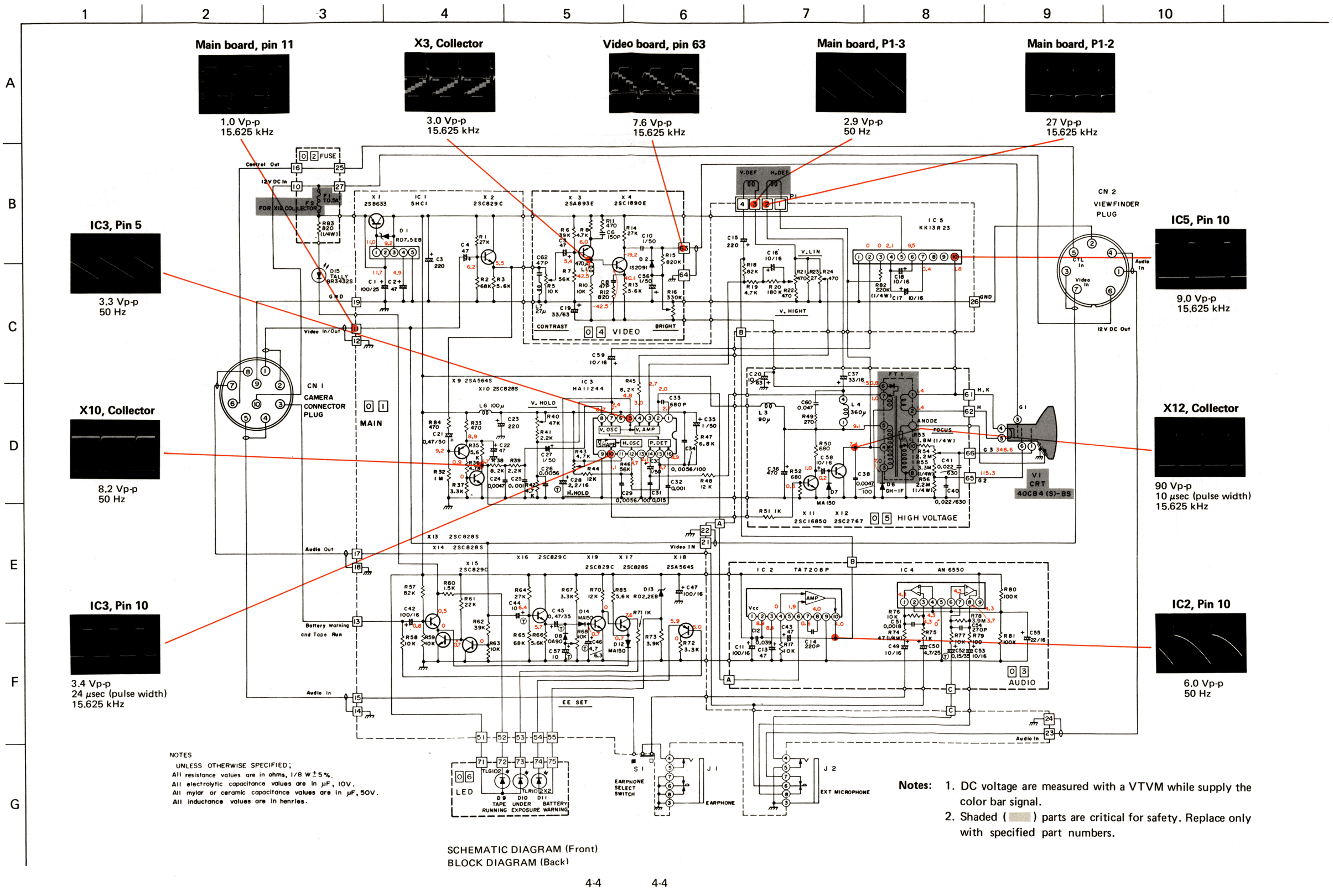
PIN NO.	PIN NAME
1	VIDEO OUT (REC) VIDEO IN (P.B)
2	GND
3	BATTERY WARNING and TAPE RUN IN
4	GND
5	AUDIO IN (P.B)
6	CTL OUT (REC)
7	AUDIO OUT (REC)
8	GND
9	GND (EARTH)
10	+12V DC IN

PIN NO.	PIN NAME
1	AUDIO IN
2	GND (EARTH)
3	GND
4	GND
5	CTL IN
6	+12V OUT
7	VIDEO IN

BLOCK DIAGRAM (Front)
SCHEMATIC DIAGRAM (Back)

4-3

4.4 SCHEMATIC DIAGRAM

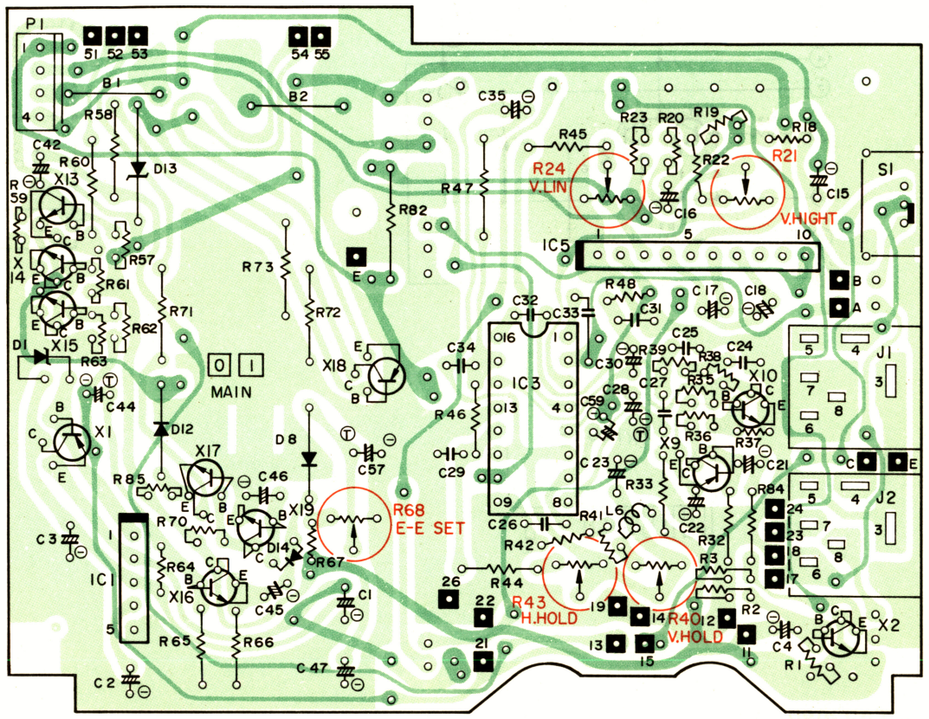


NOTES
UNLESS OTHERWISE SPECIFIED;
All resistance values are in ohms, 1/8 W ±5%.
All electrolytic capacitance values are in µF, 10V.
All mylar or ceramic capacitance values are in µF, 50V.
All inductance values are in henries.

Notes:
1. DC voltage are measured with a VTVM while supply the color bar signal.
2. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

SCHEMATIC DIAGRAM (Front)
BLOCK DIAGRAM (Back)

— MAIN BOARD —


P1
51 52 53
54 55
B1
B2
R58
R60
C42
X13
DI3
R59
R57
R61
R62
R71
X14
X15
DI
R63
C44
MAIN
0 1
X1
DI2
R85
C46
X17
D8
C57
X18
R73
R72
R82
R47
R46
C34
C29
R68
E-E SET
X19
DI4
R67
R70
C3
IC1
R64
X16
C45
C1
R65
R66
C47
C2
C35
R45
R24
V.LIN
R23
R20
R19
R18
R22
R21
V.HIGHT
C16
C15
SI
IC5
R48
C32
C33
C31
C17
C18
C25
C30
R39
C24
R38
X10
C28
C27
R35
C59
R36
R37
C21
X9
C23
R33
R84
J2
C26
R41
L6
C22
R32
R3
R42
R44
R43
H.HOLD
R40
V.HOLD
R2
C4
R1
X2
IC3
C5
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
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C61
C62
C63
C64
R1
R2
R3
R4
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R6
R7
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R9
R10
R11
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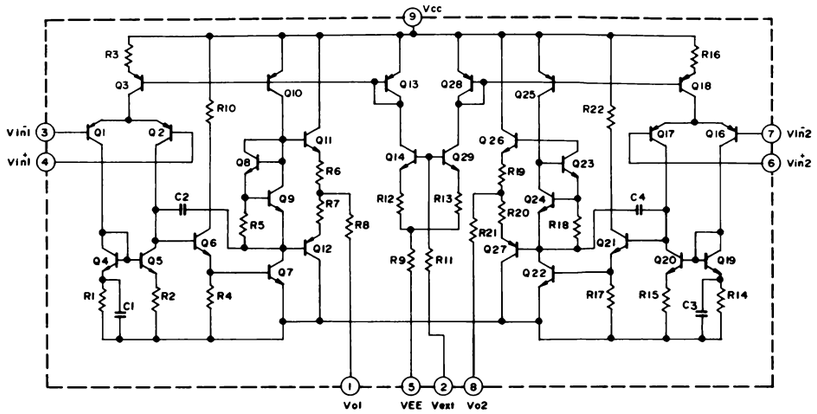
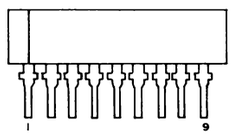
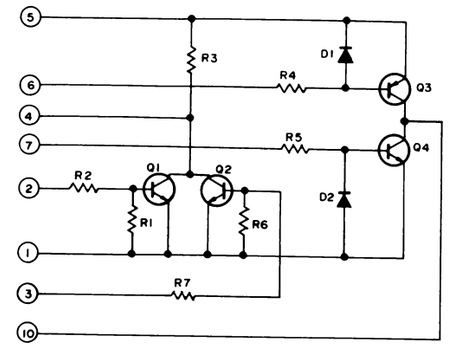
4.6 SCHEMATIC DIAGRAM OF ICs

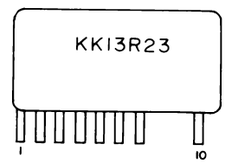
– AN6550 –



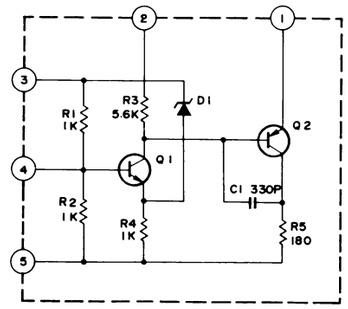


– KK13R23 –

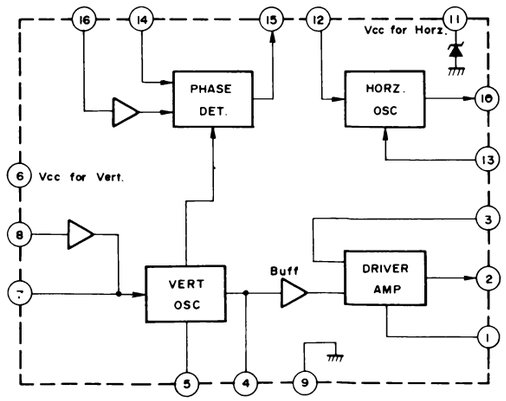




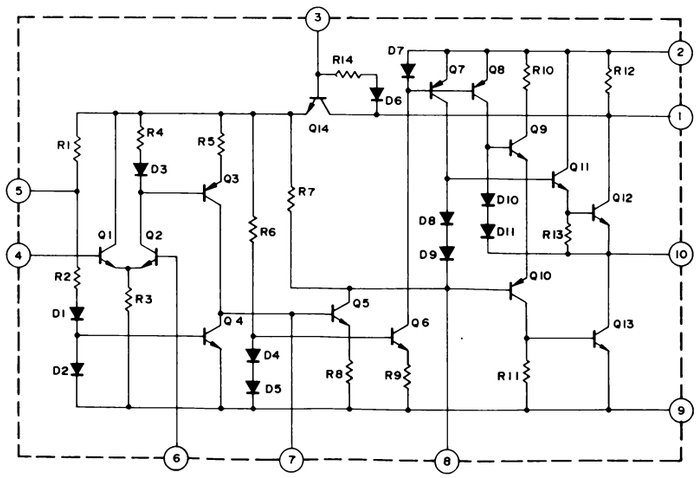
– 5HC1 –



– HA11244 –



– TA7208P –



SCHEMATIC DIAGRAM OF ICs (Front)
PRINTED CIRCUIT BOARDS (Back)

4-6

SECTION 5
EXPLODED VIEWS AND PARTS LIST

1. SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

2. STANDARD PARTS NUMBER CODING OF SCREW/WASHER/E-RING

Type of screw — Diameter — Length in mm — ISO screw

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

See 1.1 — See 1.2

Type of screw — Shape of head — Material

S	Normal screw
N	Assembly screw
L	"
D	"
G	"
M	W. Wood screw
F	Feather screw
T	Set screw
Y	"
B	Bolt
N	Nut
W	Washer
R	E-ring
E	
P	Spring

P		Pan head
S		Flat countersunk head
H		Oval countersunk head
D		Binding head
R		Round head
B		Round head
T		Truss head
W		Washer head

Symbol letter	Material
S	Steel
E	Stainless steel
C	Cast iron
U	Bronze
B	Brass
P	Phosphor bronze
N	German silver
Y	Brass
A	Aluminum
Z	Zinc alloy
K	Polycarbonate

Surface treatment

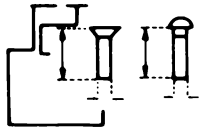
1.1 Type of screw

P	Cross-Recessed head screw
A	Tapping screw
B	Tapping screw
T	Tapping screw

1.2 Diameter and Length of screw

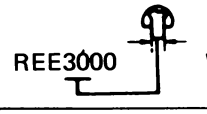
– Example –

SPBP3010ZS



(Diameter x 10)

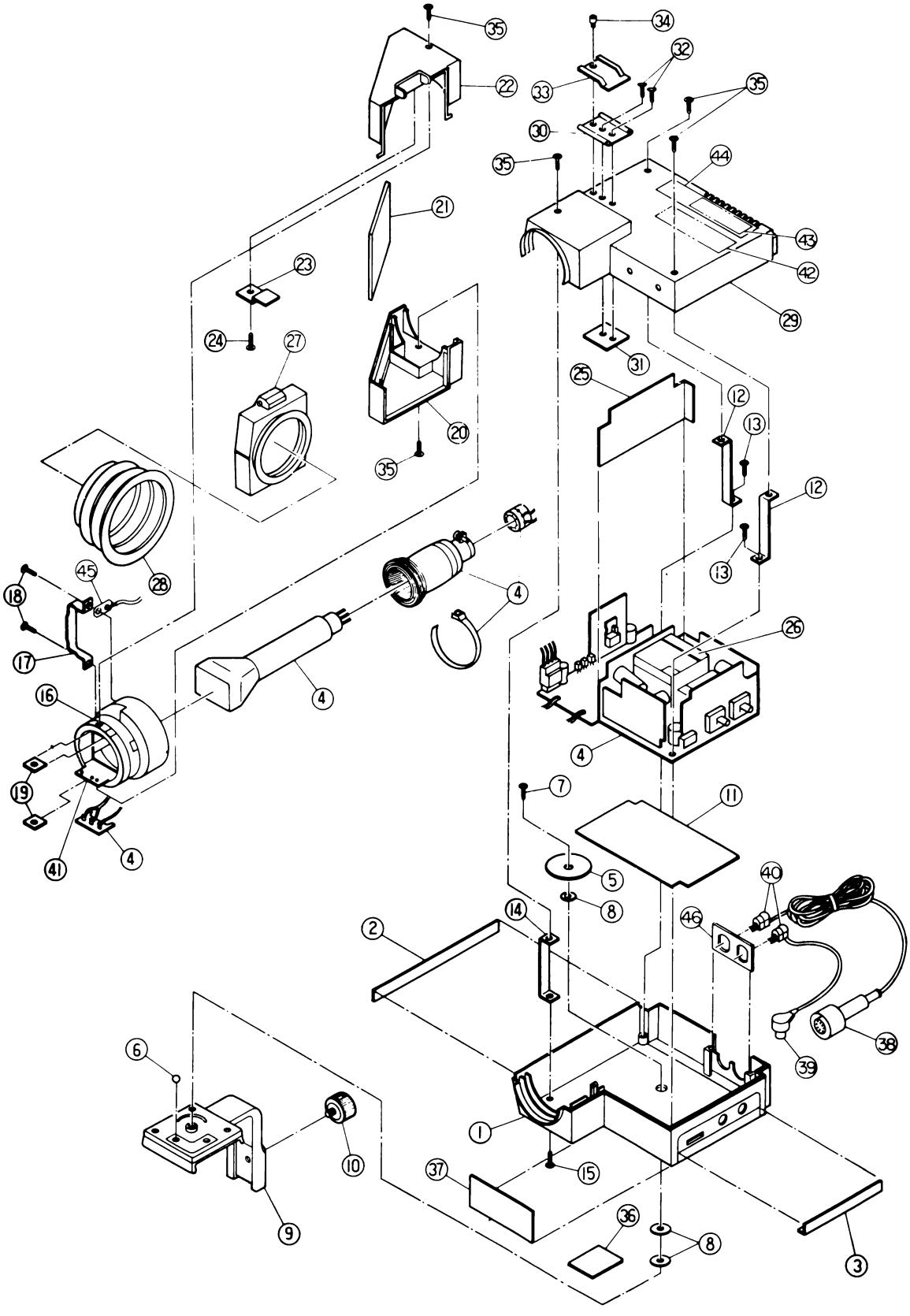
E-ring — Washer



REE3000 — WNS3000N

Symbol letter	Surface treatment
Z	Galvanization, dichromic and treatment (MFZn2.C)
N	Nickel plating (MFNi2, MFNi1)
R	Chrome plating (MBCr2, MBCr1)
G	Silver plating (SP4)
W	Nichrome platings
P	Phosphite treatment
B	Bronze plating
M	Black coloring after galvanization
A	Red coloring after galvanization
C	Blue coloring after galvanization
T	Green coloring after galvanization
V	Violet coloring after galvanization
F	Iron with black coloring

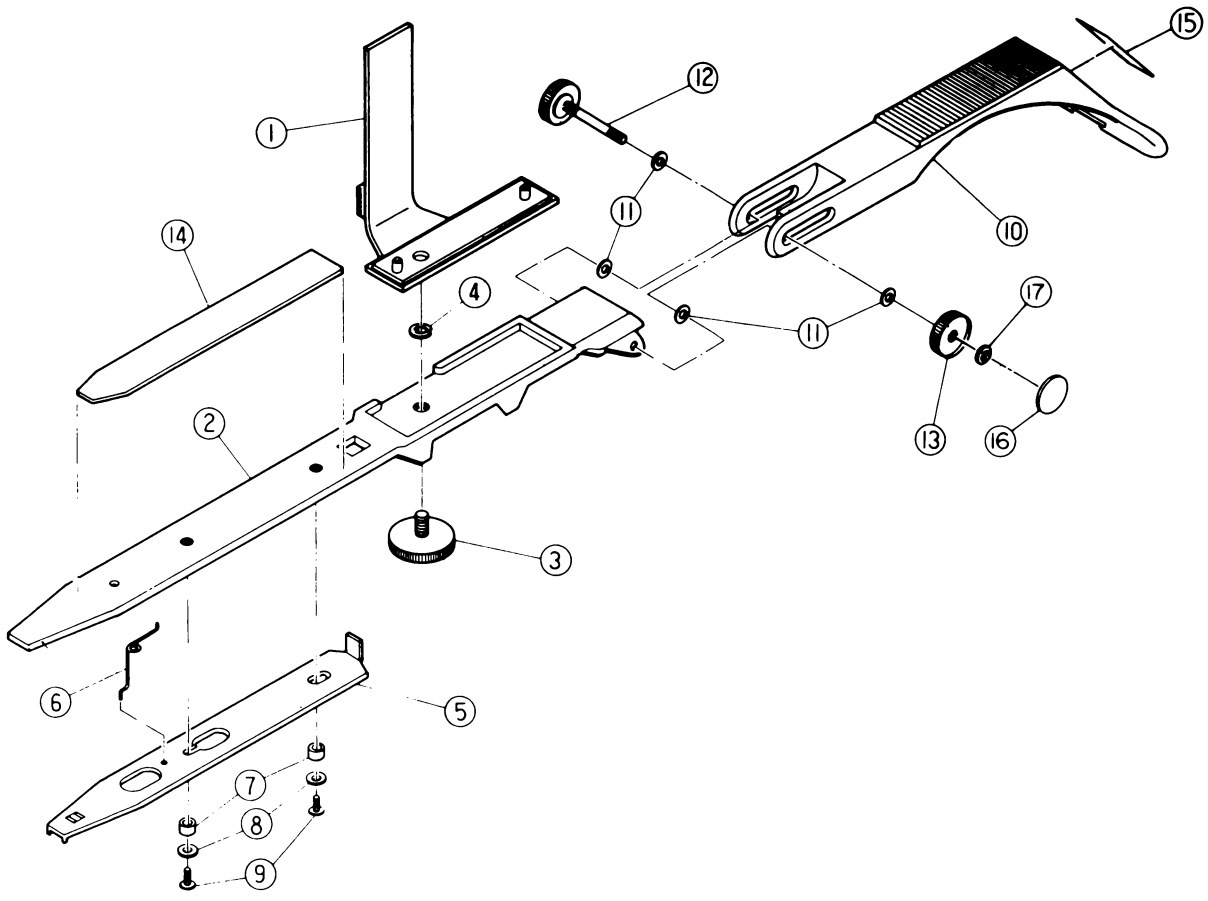
5.1 ELECTRONIC VIEWFINDER ASSEMBLY [M] [1]



ELECTRONIC VIEWFINDER ASSEMBLY [M][1]

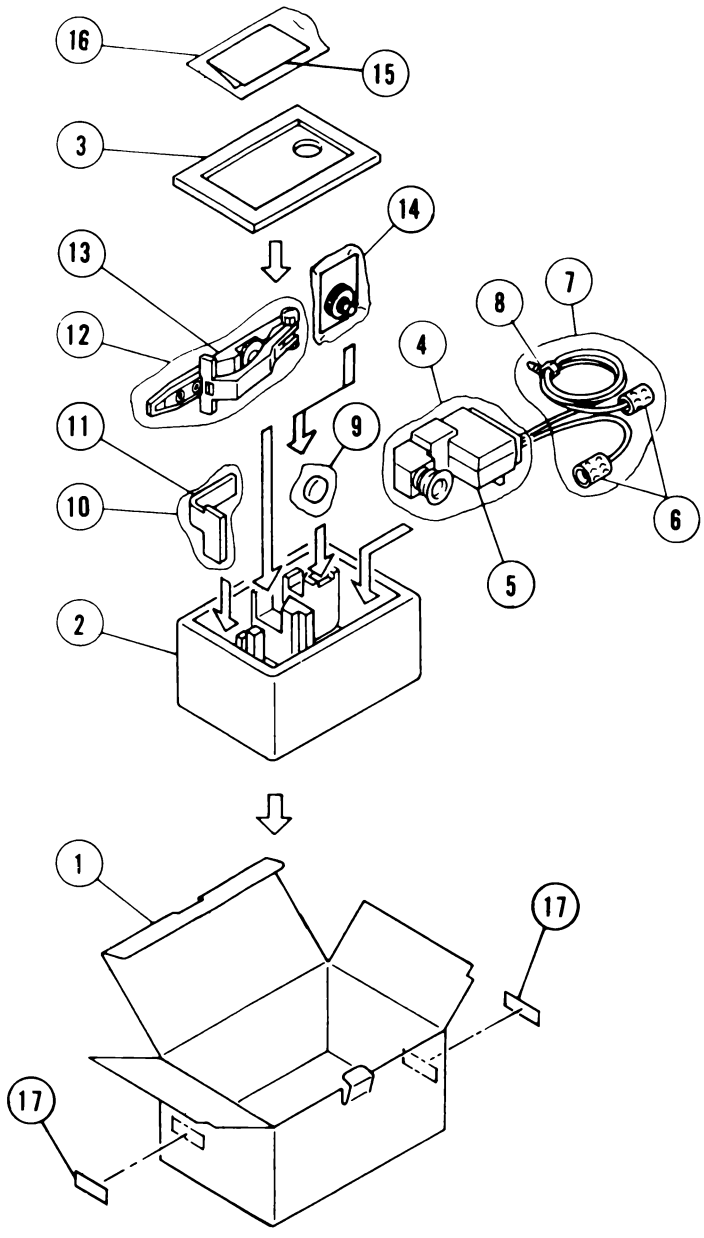
Symbol No.	Parts No.	Parts Name	Description	Q'ty
1	PU21190	Bottom Case		1
2	PU49524-2	Mark		1
3	PU49584-2	Plate		1
4	—	E.VF. Circuit Board Ass'y	See page 6-1, symbol No. [0][0]	1
5	PU49505	Rotary Spring		1
6	PU41135-5	Ball		1
7	LPSP4006Z	Screw		1
8	PU49583	Spacer		2
9	PU49573A-1	Angle (A) Ass'y	Include; ⑩ Knob	1
10	PU49572	Knob		1
11	⚠ PU49819	Insulator		1
12	PU49503	Bracket (A)		2
13	SWSP2606Z	Screw		2
14	PU49504	Bracket (B)		1
15	SDBP2606R	Screw		1
16	PU32578	VF Holder		1
17	PU49507-1-2	CRT Clamp		1
18	SPSP2606Z	Screw		2
19	PU49508	Tap. Plate		2
20	PU32579	Bottom Mirror Case		1
21	PU49514	Mirror		1
22	PU32580	Top Mirror Case		1
23	PU49515	Spring		1
24	SDBP2604R	Screw		1
25	⚠ PU49820	Insulator		1
26	⚠ PU49821	"		1
27	PU49538A-1-1	VF. Cover Ass'y		1
28	PU49516-1-2	VF. Hood		1
29	PU21191	Top Case		1
30	PU49511	Shoe		1
31	PU49509	Shoe Plate		1
32	SSSP2006Z	Screw		1
33	PU49512	Shoe Clip		1
34	PU49510	Shoe Clamp		1
35	SDBP2606R	Screw		5
36	PU49585-3	Ser. No. Plate		1
37	PU47385-2	Sticker		1
38	PU32583A	VF. Cable L. Ass'y	3m, 10 pin	1
39	PU32584A	VF Cable S. Ass'y	35cm, 7pin DIN	1
40	PU49616	Strain Relief		2
41	PU32578-2	LED Holder		1
42	QZL1004-001	Sticker		1
43	PU40378-2	"		1
44	PU50430	"		1
45	PU51411	Earth Lug		1
46	PU51412	Clamp Plate		1

5.2 SHOULDER REST ASSEMBLY [M][2]



Symbol No.	Parts No.	Parts Name	Description	Q'ty
1	PU49574A	Angle (B) Ass'y	BRACKET	1
2	PU32589	Holder		1
3	PU49577	Camera Screw		1
4	REE5000	E. Ring		1
5	PU49578	Slide Plate		1
6	PU49579	Spring		1
7	T30302-8	Collar		2
8	WNB3000N	Washer		2
9	SDBP3006NS	Screw		2
10	PU49619A	Shoulder Pad Ass'y		1
11	Q03093-102	Washer		4
12	PU50313	Knob (A)		1
13	PU50314	Knob (B)		2
14	PU50128	Plate		1
15	PU50292	Sticker		1
16	PU50315	Plate		1
17	NSS2600	Push Nut		1
18	PU49580B-5	Holder Ass'y		1

5.3 REPACKING [M] [3]



Symbol No.	Parts No.	Parts Name	Description	Q'ty
1	PUP30481-2-2	Packing Case		1
2	PUP20199	Cushion		1
3	PUP30475	Top Cushion		1
4	QPGA025-03505	Poly Bag		1
5	–	Electronic View finder Ass'y	See page 5-2, symbol No. [M] [1]	1
6	PUP40003-10	Air Cap		2
7	QPGA020-03005	Poly Bag		1
8	PU41523-2	Cord Band		1
9	PU49615	Cap		1
10	QPGA012-02505	Poly Bag		1
11	–	Angle (B) Ass'y	Incl: (10) See page 5-4, symbol No. [M] [2]	1
12	PUP40417	Poly Bag		1
13	–	Holder Ass'y	Incl: (12) See page 5-4, symbol No. [M] [2]	1
14	PU50491B	Screw Ass'y		1
15	PU30425-375	Instructions		1
16	QPGA020-03005	Poly Bag		1
17	PUP40329	Serial No. Label		2

SECTION 6
ELECTRICAL PARTS LIST

1. SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

2. Abbreviations in this list are as follows:

RESISTORS – All resistance values are in ohms (Ω).

K : 1 000
M : 1 000 000
CR : Carbon Resistor
Comp. R: Composition Resistor
WR : Wire Wound Resistor
OMR : Oxide Metal Film Resistor
VR : Variable Resistor (Potentiometer)
MFR : Metal Film Resistor
FR : Fusible Resistor

CAPACITORS – All capacitance values are in μF, unless otherwise indicated.

P : μμF
C Cap : Ceramic Capacitor
E Cap : Electrolytic Capacitor
FM Cap : Film Mica Capacitor
MM Cap : Metalized Mylar Capacitor
MP Cap : Metalized Paper Capacitor
MY Cap : Mylar Capacitor
NP Cap : Non-polar Capacitor
PC Cap : Polycarbonate Capacitor
PP Cap : Poly Pro Capacitor
PS Cap : Polystyrol Capacitor
T Cap : Tantalum Capacitor
TR Cap : Trimmer Capacitor

Tolerances of resistors or capacitors are as follows:

M : ± 20% G : ± 2%
K : ± 10% F : ± 1%
J : ± 5%

6.1 ELECTRONIC VIEWFINDER CIRCUIT BOARD ASS'Y [0][0]

Symbol No.	Parts No.	Parts Name	Description
	–	Main Circuit Board Ass'y	REF. [0][1]
	–	Fuse Circuit Board Ass'y	REF. [0][2]
	–	Audio Circuit Board Ass'y	REF. [0][3]
	–	Video Circuit Board Ass'y	REF. [0][4]
	–	High Voltage Circuit Board Ass'y	REF. [0][5]
	–	LED Circuit Board Ass'y	REF. [0][6]
	⚠40CB4(S)-BS	1.5" CRT	or 40CB4(M)-BS
	⚠PU49497	CRT Yoke Ass'y	
	PU49550	Circuit Board Joiner	
D15	BR3432S	LED	Tally Lamp

6.2 MAIN CIRCUIT BOARD ASS'Y [0][1] PU49923B

Symbol No.	Parts No.	Parts Name	Description
IC1	5HC1	Integrated Circuit	
IC2	–	–	
IC3	HA11244	Integrated Circuit	
IC4	–	–	
IC5	KK13R23	Integrated Circuit	
X1	2SB633E	Transistor	or 2SB633F
X2	2SC829C	"	
X3	–	–	
X4	–	–	
X5	–	–	
X6	–	–	
X7	–	–	
X8	–	–	
X9	2SA564S	Transistor	
X10	2SC828S	"	or 2SC828T
X11	–	–	
X12	–	–	
X13	2SC828S	Transistor	or 2SC828T
X14	"	"	"
X15	2SC829C	"	
X16	"	"	
X17	2SC828S	"	or 2SC828T
X18	2SA564S	"	
X19	2SC829C	"	
D1	RD7.5EB	Zener Diode	
D2	–	–	
D3	–	–	
D4	–	–	
D5	–	–	
D6	–	–	
D7	–	–	
D8	OA90	Diode	
D9	–	–	
D10	–	–	
D11	–	–	
D12	MA150	Diode	or 1S2473
D13	RD2.2EB	Zener Diode	
D14	MA150	Diode	or 1S2473
R1	QRD183J-273A	CR	27K 1/8W,J
R2	" -683A	"	68K "
R3	" -562A	"	5.6K "
R4	–	–	
R5	–	–	
R6	–	–	
R7	–	–	
R8	–	–	
R9	–	–	
R10	–	–	
R11	–	–	
R12	–	–	
R13	–	–	
R14	–	–	
R15	–	–	
R16	–	–	
R17	–	–	

Symbol No.	Parts No.	Parts Name	Description
R18	QRD183J-823A	CR	82K 1/8W,J
R19	" -472A	"	4.7K "
R20	" -184A	"	180K "
R21	QVZ3507-471	VR	470
R22	QRD181J-471A	CR	470 1/8W,J
R23	QRD183J-270A	"	27 "
R24	QVZ3507-471	VR	470
R25	–	–	
R26	–	–	
R27	–	–	
R28	–	–	
R29	–	–	
R30	–	–	
R31	–	–	
R32	QRD181J-105A	CR	1M 1/8W,J
R33	" -471A	"	470 "
R34	–	–	
R35	QRD183J-562A	CR	5.6K 1/8W,J
R36	" -472A	"	4.7K "
R37	" -332A	"	3.3K "
R38	" -822A	"	8.2K "
R39	" -222A	"	2.2K "
R40	QVZ3507-473	VR	47K
R41	QRD183J-222A	CR	2.2K 1/8W,J
R42	QRD181J-472A	"	4.7K "
R43	QVZ3507-472	VR	4.7K
R44	QRD181J-123A	CR	12K 1/8W,J
R45	" -822A	"	8.2K "
R46	" -563A	"	56K "
R47	" -682A	"	6.8K "
R48	" -123A	"	12K "
R49	–	–	
R50	–	–	
R51	–	–	
R52	–	–	
R53	–	–	
R54	–	–	
R55	–	–	
R56	–	–	
R57	QRD183J-823A	CR	82K 1/8W,J
R58	QRD181J-103A	"	10K "
R59	QRD183J-103A	"	10K "
R60	QRD181J-152A	"	1.5K "
R61	QRD183J-223A	"	22K "
R62	" -393A	"	39K "
R63	" -103A	"	10K "
R64	" -273A	"	27K "
R65	QRD181J-683A	"	68K "
R66	" -562A	"	5.6K "
R67	QRD183J-332A	"	3.3K "
R68	QVZ3507-103	VR	10K
R69	–	–	
R70	QRD181J-123A	CR	12K 1/8W,J
R71	" -102A	"	1K "
R72	" -332A	"	3.3K "
R73	" -392A	"	3.9K "
R74	–	–	
R75	–	–	
R76	–	–	

Symbol No.	Parts No.	Parts Name	Description
R77	–	–	
R78	–	–	
R79	–	–	
R80	–	–	
R81	–	–	
R82	QRD141J-224	CR	220K 1/4W,J
R83	–	–	
R84	QRD181J-471A	CR	470 1/8W,J
R85	QRD183J-562A	"	5.6K "
C1	QET41ER-107M	E. Cap	100 25V
C2	QEK41AM-476	"	47 10V
C3	QEV41CR-227M	"	220 16V
C4	QEK41AM-476	"	47 10V
C5	–	–	
C6	–	–	
C7	–	–	
C8	–	–	
C9	–	–	
C10	–	–	
C11	–	–	
C12	–	–	
C13	–	–	
C14	–	–	
C15	QET41AR-227	E. Cap	220 10V
C16	QEK41CM-106	"	10 16V
C17	" -106	"	10 "
C18	" -106	"	10 "
C19	–	–	
C20	–	–	
C21	QEK41HM-474M	E. Cap	0.47 50V
C22	QEK41AM-476	"	47 10V
C23	QET41AR-227	"	220 "
C24	QFN41HK-472N	MY Cap	0.0047 50V
C25	" -102N	"	0.001 "
C26	" -562N	"	0.0056 "
C27	QEK41HM-105M	E Cap	1 50V
C28	QEE41CM-225	T. Cap	2.2 16V
C29	QFM42AK-562N	MY Cap	0.0056 100V
C30	QEK41HM-105M	E. Cap	1 50V
C31	QFN41HK-153N	MY Cap	0.015 "
C32	" -102N	"	0.001 "
C33	QCS11HJ-681	C. Cap	680P "
C34	QFM42AK-562N	MY Cap	0.0056 100V
C35	QEK41HM-105M	E. Cap	1 50V
C36	–	–	
C37	–	–	
C38	–	–	
C39	–	–	
C40	–	–	
C41	–	–	
C42	QET41AR-107M	E. Cap	100 10V
C43	–	–	
C44	QEE41AM-106	T. Cap	10 10V
C45	QEE41VM-474	"	0.47 35V
C46	QEE40JM-475	"	4.7 6.3V
C47	QET41AR-107M	E. Cap	100 10V
C48	–	–	
C49	–	–	

Symbol No.	Parts No.	Parts Name	Description
C50	–	–	
C51	–	–	
C52	–	–	
C53	–	–	
C54	–	–	
C55	–	–	
C56	–	–	
C57	QEE41AM-106	T. Cap	10 10V
C58	QEK41CM-106	C. Cap	10 16V
C59	"	"	10 "
L6	PU49995-101K	Peaking Coil	(for R34)100μH
	QSS1201-023	Slide Switch	
	PU49535-1-2	Heat Sink	for X1
	PU45375-3	Transistor Spacer	"
	SPKP3004S	Screw	"
J1	QMS3503-005	Jack Ass'y	
J2	"	"	
P1	PU43351-4	Connector	

6.3 FUSE CIRCUIT BOARD ASS'Y [0][2] PU49925C

Symbol No.	Parts No.	Parts Name	Description
R83	QRD141J-821	CR	820 1/4W,J
F1	⚠QMF51A2-R50-BS	Fuse	0.5A 250V
	A44594-001	Fuse Clip	
	PU49911	Fuse Circuit Board	

6.4 AUDIO CIRCUIT BOARD ASS'Y [0][3] PU49926A

Symbol No.	Parts No.	Parts Name	Description
IC-2	TA7208P	Integrated Circuit	
IC-3	–	–	
IC-4	AN6550	Integrated Circuit	
R17	QRD183J-103A	CR	10K 1/8W,J
R74	QRD143J-470	CR	47 1/4W,J
R75	QRD183J-102A	"	1K 1/8W,J
R76	" -103A	"	10K "
R77	" -103A	"	10K "
R78	QRD143J-395	"	3.9M 1/4W,J
R79	QRD183J-101A	"	100 1/8W,J
R80	" -104A	"	100K "
R81	" -104A	"	100K "
C11	QET41AR-107	E. Cap	100 10V
C12	QFN41HK-393N	MY Cap	0.039 50V
C13	QEK41AM-476	E. Cap	47 10V
C14	QCS11HJ-221	C. Cap	220P 50V
C43	QEK41AM-476	E. Cap	47 10V
C44	–	–	
C45	–	–	
C46	–	–	
C47	–	–	
C48	–	–	
C49	QEK41CM-106	E. Cap	10 16V
C50	QEK41EM-475M	"	4.7 25V
C51	QFN41HK-182N	MY Cap	0.0018 50V
C52	QEE41VM-154	T. Cap	0.15 35V
C53	QEK41CM-106	E. Cap	10 16V
C54	QCS11HJ-271	C. Cap	270P 50V
C55	QEK41CM-226M	E. Cap	22 16V

6.5 VIDEO CIRCUIT BOARD ASS'Y [0][4] PU49928B

Symbol No.	Parts No.	Parts Name	Description
X3	2SA893E	Transistor	
X4	2SC1890E	"	
D2	1S2091	Diode	
R5	QVZ3507-103	VR	10K
R6	QRD183J-393A	CR	39K 1/8W,J
R7	" -563A	"	56K "
R8	" -472A	"	4.7K "
R9	–	–	
R10	QRD183J-103A	CR	10K 1/8W,J
R11	QRD181J-471A	"	470 "
R12	QRD183J-821A	"	820 "
R13	" -562A	"	5.6K "
R14	" -273A	"	27K "
R15	" -824A	"	820K "
R16	QVP4A0B-334	VR	330K
C5	QEK41AM-476	E. Cap	47 10V
C6	QCS11HJ-151	C. Cap	150P 50V
C7	–	–	
C8	QCS11HJ-470	C. Cap	47P 50V
C9	–	–	
C10	QEK41HM-105M	E. Cap	1 50V
C19	QET41JR-336M	E. Cap	33 63V
C56	QEK41HM-105M	E. Cap	1 50V
C62	QCS11HJ-470	C. Cap	47P 50V
L1	PU48530-471J	Peaking Coil	470μH
L7	PU42875-270	"	27μH

6.6 HIGH VOLTAGE CIRCUIT BOARD ASS'Y

[0][5] PU49927A

Symbol No.	Parts No.	Parts Name	Description
X11	2SC1685Q	Transistor	
X12	2SC2767	"	
D6	GH-1F	Diode	
D7	MA150LF	"	or 1S2473VE
R49	QRD183J-271A	CR	270 1/8W,J
R50	" -681A	"	680 "
R51	" -102A	"	1K "
R52	" -681A	"	680 "
R53	QRD141G-185	"	1.8M 1/4W,G
R54	QVP9A0B-225	VR	2.2M
R55	QRD141G-335	CR	3.3M 1/4W,G
R56	" -225	"	2.2M "
C20	QET41JR-106	E. Cap	10 63V
C36	QEV41AR-477M	E. Cap	470 10V
C37	QET41CR-336	"	33 16V
C38	QFP42AJ-472M	PP Cap	0.0047 100V
C39	—	—	
C40	QFH42JM-223	M.M. Cap	0.022 630V
C41	" -223	"	0.022 "
C60	QFN41HK-473N	MY Cap	0.047 50V
L3	PU49534	Coil	90μH
L4	PU49677	"	360μH
FT1	⚠PU49499-BS	Flyback Transformer	
	PU45848	CRT Socket	
F2	⚠PU48295	Thermal Fuse	for X12
	WLS2000ZS	Washer	"
	SSSP2006ZS	Screw	"
	NNS2000ZS	Nut	"

6.7 LED CIRCUIT BOARD ASS'Y

[0][6] PU49924A

Symbol No.	Parts No.	Parts Name	Description
D9	TLG102	LED	
D10	TLR102	"	
D11	"	"	